TRANSLATION OF THE ANNEX TO THE IPER

AMENDED CLAIMS

1. High-frequency plasma beam source having a plasma chamber (3) for a plasma, electrical means (8, 9) for igniting and sustaining the plasma, an extraction grid (4) at a high-frequency potential for extracting a plasma beam (I) from a plasma chamber (3) as well as an outlet opening, preferably to a vacuum chamber (7), the extraction grid (4) being arranged in the area of the outlet opening, characterized in that the plasma beam (1) is made of a divergent shape by a specific interaction between the plasma and the extraction grid (4).

2. High-frequency plasma beam source according to claim 1, characterized in that the divergency of the plasma beams (I) is achieved by a non-planar shape and/or a large mesh width in the extraction grid (4).

3. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that for the achievement of a high homogeneity of the plasma current density on at least a portion of a curved, especially spherical surface that is to be irradiated, the plasma beam (I) is adapted to the shape of at least a portion of the surface area.

4. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that the extraction grid (4), as seen from the plasma chamber (3), is of concave shape, preferably a portion of the surface of the extraction grid being a section of the mantle surface of a cylindrical body.

5. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that the extraction grid (4) is of a non-uniform shape over at least a portion of its surface.

6. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that at least one mask disposed outside of the plasma chamber (3) is provided.

7. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that the exit opening is covered with masks in areas.

8. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that the extraction grid (4) has meshes with a mesh width that is less than the thickness of the space charge zone between extraction grid (4) and the plasma in the plasma chamber (3).

9. High-frequency plasma beam source according to at least one of the foregoing claims 1 to 7, characterized in that the extraction grid (4) has meshes with a mesh width that is at least as great as a thickness of the space charge zone between the extraction grid (4) and the plasma in the plasma chamber (3).

10. High-frequency plasma beam source according to claim 9, characterized in that the extraction grid (4) has meshes with a mesh width that is no more than large enough for the plasma to remain substantially within the plasma space (3).

11. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that at lease one mask is provided with an electrical potential for the modulation of the plasma beam (I).

12. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that in a coating chamber (7), substantially opposite the exit opening, a curved surface, preferably a dome (11) with substrates (10.1, 10.2, 10.3, 10.4, 10.5, 10.6), is arranged.

13. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that an evaporating source is provided in addition to the high-frequency plasma beam source (I).

14. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that the extraction grid is formed by a tungsten mesh with a wire thickness of about 0.02 - 3 mm, preferably 0.1 - 1 mm.

15. High-frequency plasma beam source according to at least one of the foregoing claims, characterized in that at least one magnet (5) is provided for locking the plasma in the area of the plasma chamber (3).

16. Vacuum chamber with a housing (2), a high-frequency beam source and a surface to be irradiated, characterized in that the high-frequency plasma beam source (1) is configured according to at least one of the foregoing claims.

17. Vacuum chamber according to claim 16, characterized in that the surface to be irradiated is curved, preferably a dome (11) and comprises one or more substrates (10.1, 10.2, 10.3, 10.4, 10.5, 10.6).

18. Method for the irradiation of a surface with a plasma beam of a high-frequency plasma beam source, characterized in that a divergent plasma beam (I) is used and the high-frequency plasma beam source is configured according to at least one of claim 1 - 16.

19. Method according to claim 18, characterized in that the plasma beam (I) has a beam characteristic with a divergence of no more than n = 16, preferably n = 4, n being an exponent of a cosine distribution function.

20. Method according to at least one of claims 18 and 19, characterized in that the beam characteristic of the plasma beam (I) is brought about by a controlled interaction between the plasma and an extraction grid (4).

21. Method according to at least one of claims 18 to 20, characterized in that a controlled interaction between an extracted plasma and at least one mask disposed outside of the plasma chamber (3) is used.

22. Method according to at least one of claims 18 to 21, characterized in that for the achievement of a great homogeneity of the plasma beam density on at least a portion of a surface, the beam characteristic of the plasma beam (I) is adapted to at least a portion of the irradiated surface.

23. Method according to at least one of claims 18 to 22, characterized in that a curved surface, preferably a dome (11) is provided.

24. Method according to at least one of claims 18 to 23. characterized in that a coating of the surface is brought about by the irradiation of the surface.

25. Method according to at least one of claims 18 to 24, characterized in that a modification and/or cleaning of the surface is performed by the irradiation of the surface.